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Integrating cutting edge research into daily clinical practice

About The Research and Education Center (REC) at Aspetar

We believe that research is the essential foundation of outstanding player performance and athlete care. We work to integrate cutting edge research into daily clinical practice both in the hospital and on the playing field.

Aspetar is constantly involved in ground-breaking research endeavors. Our highly trained sports medicine and sports science research team utilize state-of-the-art equipment and techniques to collect data that can be used to allow athletes to reach their full potential.

The Center’s research findings are published in international peer-reviewed publications. The team regularly presents their knowledge at forums and conferences held by the world’s leading stakeholders in sports medicine and exercise sciences.

Areas of focus include: The Epidemiology of Football Injuries and their Management, Groin Pain, Sports Cardiology, Athlete Screening, Epidemiology of Medical Conditions, Ramadan and Sport, Environmental Physiology, Healthy Lifestyle.
Playing tennis in extreme heat

Aspetar contributes to understand fatigue during match-play tennis in the heat

Tennis is a high-intensity long-duration intermittent activity mediated by the interplay of various physiological processes. When played in the heat, the development of thermal and perceptual strain impairs performance. Moreover, exercise in the heat is known to induce dehydration as well as reduce aerobic performance and cognitive function, which are suggested to underlie the physical components of match-play tennis. Playing in the heat may also impair immune function, sleep and recovery, all of which may be associated with alterations in on-court performance.

Researchers at Aspetar conducted a study evaluating highly trained tennis players during simulated match-play. The study involved one session in 22°C conditions in which fluids were consumed ad libitum, and two sessions in 37°C heat with ad libitum fluid consumption in the first, and an individualized hydration regimen in the second. Neuromuscular function, tennis-related physical performance (i.e. sprinting, agility and leg power), match characteristics (e.g. point duration, effective playing time), cognitive performance, immune function and sleep quality were pre-examined, during and post-play, as well as during the recovery period at 24 h and 48 h after match completion.

This comprehensive multi-disciplinary study has provided insight into the development of fatigue during match-play tennis in hot environmental conditions. It has allowed for determining that playing in the heat
reduces effective playing time, skeletal muscle force production for 24 h and complex cognitive function immediately post-match. However, athletic performance (i.e. sprinting and jumping) was shown to similarly decrease after playing in hot and cool environmental conditions, and oxidative stress to increase in conjunction with an upregulation of antioxidant status. Moreover, this study has helped to describe the hydration habits of high level tennis players under heat stress and demonstrate to a certain extent how the level of play may be maintained, as well as how heat related injuries may be avoided.

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Skeletal muscle force production is impaired for 24 hours after match-play tennis in the heat.
Improving performance by training in extreme heat

Aspetar develops optimal training procedures using heat and altitude exposure

To achieve athletic prowess requires well-developed physical capacities alongside technical and tactical proficiencies. To maximize the technical and tactical training time, coaches are seeking time-efficient strategies to improve the physical fitness of their players or athletes.

In this context, the use of heat training and/or altitude exposure has gained popularity in elite sports, since both methods have the potential to improve performance in these environments, but also in 'normal' temperate environmental conditions. These training methods allow for significant time savings, as many of the purported physiological adaptations are deemed to occur without altering the tactical contents of the training sessions.

Researchers from Aspetar demonstrated that there is a high individual variability in the physiological responses to heat acclimatization of elite athletes. Importantly,
athletes with the “best acclimatization responses” gain greater performance benefit. Heat acclimatization has also improved physical performance in temperate environmental conditions. Researchers from Aspetar developed a heat-response test to determine the response of each athlete within a group or each player within a team. This test identifies which athletes respond or do not respond to the training camp, and therefore allows for individualized training procedures. In addition, Aspetar researchers developed a new model combining training in the heat with altitude exposure (sleep high / train low). This innovative cocktail has produced significant performance improvements in elite professional athletes.

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Aspetar developed a heat-response test that individualizes both training and heat-acclimatization for the elite athlete.

Training in the heat can improve the ability to perform in hot and temperate environments.
Ramadan is a holy month for Muslims in which they observe intermittent fasting during the daylight hours for approximately 30 days. Ramadan has coincided with major international competitions in recent times (e.g. London 2012 Summer Olympic Games), and will do so again (e.g. FIFA World Cup 2014, UEFA Championship 2016). Therefore, the influence of Ramadan fasting on both health and performance of athletes needs to be considered.

Researchers at Aspetar have demonstrated that total daily energy intake for Qatar Athletes remains sufficient despite a reduction to two meals per day, however nutritional deficiencies have been reported. Dehydration is uncommon given that training and competition times are delayed until the late evening. Notably, such schedules have been shown to delay the timing of sleep or reduce nocturnal sleep time, which results in daytime fatigue, reduced concentration or disturbed mood.

In 2011, Aspetar hosted the 1st International Consensus Meeting on Ramadan and Football. Participation by international researchers, coaches, and athletes allowed for a thorough discussion of the scientific evidence and practical issues to consider. A consensus was reached and was published in a special issue.
in the Journal of Sports Sciences along with a current summary of the scientific evidence and practical recommendations on best practice for training and competition during Ramadan. It was concluded that high level athletes can maintain performance during Ramadan if physical training, food and fluid intake, and sleep are well controlled.

Given the growing popularity and participation in football among Muslims across a diverse geographic area, the vision of Aspetar to focus on issues surrounding Ramadan and Sport is well received. Continued research and collaborations will provide for on-going surveillance and ensure that athletes remain healthy and able to reach their full potential on the field.

High level athletes can maintain performance during Ramadan if physical training, food and fluid intake, and sleep are well controlled.
The use of forbidden substances and methods to enhance performance is a major threat not only for the health of the athlete, but also for the integrity of high performance sport as a role model for youngsters to engage in a healthy lifestyle. The recent doping scandals have shown to what extent doping can shake sports in its fundamentals.

The traditional method to detect doping has therefore obvious limitations. Therefore, new strategies have been developed, such as the “Athlete’s Biological Passport”. With this technique, not the doping substance itself, but rather its effects on the organism of the athlete are detected. It uses a longitudinal monitoring of biomarkers from blood and urine tests, which are gathered during conventional doping tests. Mathematical methods are then used to identify doping suspicious patterns.

Research conducted at Aspetar aims at improving the ability of this system to pick up doping suspicious patterns by quantifying factors that might interfere with certain biomarkers: Projects on the impact of fluid shifts in the organism and the impact of environmental factors such as heat or altitude are currently being conducted. By
Aspetar research aims at improving the efficiency of the “Athlete’s Biological Passport” in order to give the clean athlete a leveled playing field.

The “Athlete’s Biological Passport” identifies the effect of doping substances on the organism of the athlete.

these means, the ability of the “Athlete’s Biological Passport” to identify cheats can be improved by approximately 30%.

Other projects include the discovery of new markers suitable for the “Athlete’s Biological Passport” which might add to the portfolio of variables that are currently in use.

To put their knowledge and research experience into practice, Aspetar researchers provide scientific expertise to major stakeholders in Sports and Anti-doping on a regular basis.
Preventing sudden cardiac death in Middle-Eastern athletes

Aspetar has the largest pre-participation screening programme for high-level athletes in West-Asia

Athletes are often portrayed as being the epitome of health, owing to their unique lifestyle and extraordinary physical achievements. However, a small proportion of athletes die suddenly and unexpectedly; so-called sudden cardiac death. Approximately 80% of non-traumatic sudden deaths in athletes younger than 35 years of age are caused by inherited structural and functional heart abnormalities, which may predispose to sudden cardiac death by causing cardiac rhythm disturbances.

Aspetar’s sports cardiology project attempts to identify pre-existing cardiovascular abnormalities, ensuring optimal management, and thereby reducing the potential for adverse events and loss of life. Each athlete receives a physical examination by one of Aspetar’s sports medicine physicians, a family/personal history questionnaire, a resting 12-Lead ECG and an echocardiogram as standard. If further testing is required, Aspetar has the capability of performing exercise stress testing, 24h-holter ECG testing, and even cardiac magnetic resonance imaging.

Since 2007, over 5,500 athletes have gone through the Aspetar sports cardiology project. Accordingly, researchers at Aspetar were the first to:
1. Describe the electrocardiographic and echocardiographic features of the ‘Arabic Athletes Heart’, helping to reduce the number of false-positive diagnoses and unnecessary disqualifications due to suspected pathological heart disease.

2. Identify the prevalence of conditions associated with sudden cardiac death in West-Asian and Middle-Eastern athletes.

3. Identify that Black African descent is an independent predictor of ‘uncommon’ ECG changes when compared with West-Asian and Caucasian athletes.

4. Identify that prevalence of a disease associated with sudden cardiac death is two times higher in black athletes than in West-Asian athletes.

5. Identify that West-Asian football players have a greater number of cardiovascular markers of disease than their Black African counterparts, despite being matched for physical activity levels.

Pre-participation screening may identify many of the cardiac pathologies associated with sudden cardiac death.

The sudden cardiac death of a young athlete is a rare but highly traumatic event.
Exercising in either warm or oxygen-deprived (hypoxic) environments poses a severe challenge to the human respiratory, circulatory and metabolic systems. Under these circumstances, it is a classical observation that athletic performance is more largely hampered compared with standard conditions. However, it remains obscure, whether competing in hostile environments further stresses the neuromuscular system, and to what extent is this stress associated with compromised locomotor pattern.

Researchers at Aspetar are conducting a series of field and laboratory-based experiments evaluating the impact of environmental stress (temperature in excess of 35°C / simulated altitude ranging from 2000 to 4000 m) on neuromuscular function and the biomechanical manifestation of fatigue. To examine this, performance tests replicating match performance (e.g., high-intensity efforts including multiple sprints in football players) are either performed on a special ‘instrumented’ treadmill in a climatic chamber or in an ecological situation; i.e. inside hypoxic inflatable tents fixed upon a playing field.

Aspetar contributes to understand how neuromuscular fatigue develops when exercising in hot and hypoxic environments, and to what extent does this contribute to the production of less efficient running strides.
Repeated sprinting on natural grass with Qatari players wearing their football boots impairs their leg-spring behavior towards a compromised musculo-skeletal stiffness regulation. In the laboratory, exercising in hot or hypoxic environments exacerbates the degree of fatigue-induced changes in sprinting/running mechanics, and these modifications relate to an increase in the energy cost of running. Aspetar is attempting to create performance strategies that limit the negative influence of additional loads imposed by challenging environments upon the neuromuscular system, which in turn, may improve athletic performance and potentially reduce injury.

Aspetar evaluates how a high core body temperature (hot environment) or inadequate muscle and/or cerebral oxygen delivery (hypoxic environment) exacerbates neuromuscular fatigue, and how this further deteriorates locomotor performance.
Hamstring injuries are a nightmare for elite athletes. Once injured, the athlete can expect several weeks to a month or more out of sport and a 20-25% chance of re-injury. Aspetar’s research focuses on developing new treatment options for these muscle injuries.

Aspetar, Qatar Orthopaedic and Sports Medicine hospital, is the first hospital worldwide to investigate the effect of a novel and innovative therapy (platelet rich plasma (PRP)) for hamstring injuries in elite athletes in a high level quality trial.

Anecdotal and low-level evidence suggests that PRP injection hasthe potential to facilitate healing and allow a 50% earlier return to sport after muscles injuries. It might potentially be the difference between winning and losing the game; and might allow for the winning of the championship.

Aspetar’s goal is assisting athletes in achieving their full potential and in order to achieve this, we are performing this high-level randomised controlled trial on the benefits of PRP in muscle injuries.
The future champion

The near future will show us if this innovative therapy will allow our elite athletes earlier return to sports and ability to regain their full potential. That might be the difference between finishing second or being the champion.

Hamstring injuries are the terror for athletes.

Difference between winning and losing?
Aspetar headquarters located in the heart of Aspire Zone foundation, in Qatar